

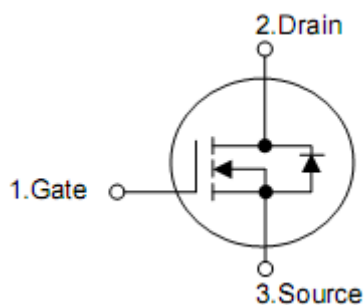
1. Description

KCX2704A is an N-channel enhancement mode power MOSFET which is produced using LVMOS technology. The improved process and cell structure have been especially tailored to minimize on-state resistance, provide superior switching performance. This device is widely used in power management for UPS and Inverter Systems.

2. Features

- $R_{DS(ON)}=1.25m\Omega$ (typ.) @ $V_{GS}=10V$
- Low gate charge
- Low C_{rss}
- Fast switching
- Extreme dv/dt rated
- 100% avalanche tested
- Pb-free lead plating
- RoHS compliant

3. Pin configuration



Pin	Function
1,2,3	Source
4	Gate
5,6,7,8	Drain

4. Ordering Information

Part Number	Package	Brand
KCY2704A	DFN5*6	KIA

5. Absolute maximum ratings

$T_J=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Drain-to-Source Voltage	V_{DSS}	—	40	-	-	V
Gate-to-Source Voltage	V_{GSS}	—	-20	-	20	V
Continuous Drain Current	I_D	$T_C=25^{\circ}\text{C}$	-	-	150	A
		$T_C=100^{\circ}\text{C}$	-	-	95	A
Pulsed Drain Current ¹⁾	I_{DM}	$T_C=25^{\circ}\text{C}$	-	-	500	A
Total Power Dissipation ²⁾	P_D	$T_C=25^{\circ}\text{C}$	-	-	104	W
Avalanche Energy	EAS	$L=0.1\text{mH}, V_{DD}=32\text{V}, R_G=25\Omega$, Starting temperature $T_J=25^{\circ}\text{C}$	-	-	266	mJ
Single Pulsed Current	I_{AS}	—	-	-	73	A
Operation Junction Temperature Range	T_J	—	-55	-	150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	—	-55	-	150	$^{\circ}\text{C}$

6. Thermal characteristics

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	—	-	-	1.2	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	—	-	-	50	$^{\circ}\text{C/W}$
Soldering Temperature (SMD)	T_{sold}	Reflow soldering: $10 \pm 1\text{sec}, 3\text{times}$ Wave soldering: $10^{+2}_{-0}\text{sec}, 1\text{time}$	-	-	260	$^{\circ}\text{C}$

7. Electrical characteristics

(T_J=25°C, unless otherwise notes)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250μA	40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V, T _J =25°C	-	-	1	μA
		V _{DS} =40V, V _{GS} =0V, T _J =125°C	-	2	-	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.4	-	2.4	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =50A	-	1.25	1.45	mΩ
		V _{GS} =4.5V, I _D =50A	-	1.65	2.1	mΩ
Gate Resistance	R _g	F=1MHz	-	2.6	-	Ω
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f=1MHZ	-	5700	-	pF
Output Capacitance	C _{oss}		-	1650	-	pF
Reverse Transfer Capacitance	C _{rss}		-	43	-	pF
Turn-on Delay Time	t _{d(on)}	V _{GS} =10V, V _{DD} =20V, I _D =50A, R _G =4.7Ω ^{3),4)}	-	22	-	ns
Turn-on Rise Time	t _r		-	64	-	ns
Turn-off Delay Time	t _{d(off)}		-	87	-	ns
Turn-off fall Time	t _f		-	28	-	ns
Total Gate Charge	Q _g	V _{GS} =10V, V _{DD} =20V, I _D =50A ^{3),4)}	-	88	-	nC
Gate-Source Charge	Q _{gs}		-	30	-	nC
Gate-Drain Charge	Q _{gd}		-	9.4	-	nC
Gate-plateau Voltage	V _{plateau}		-	4.6	-	V
Continuous Diode Forward Current	I _S	Integral reverse P-N junction diode in the MOSFET	-	-	150	A
Diode Plus Current	I _{S,pulse}		-	-	500	A
Diode Forward Voltage	V _{SD}	I _S =100A, V _{GS} =0V	-	-	1.4	V
Reverse Recovery Time	t _{rr}	I _S =37.5A, V _{GS} =0V, V _R =40V di/dt=100A/us ³⁾	-	67	-	ns
Reverse Recovery Chrage	Q _{rr}		-	73	-	nC

Notes:

- 1).Pulse time 5us;
- 2).The dissipation power will change with temperature, derating above 25°C: 0.83W/°C;
- 3).Pulse Test: Pulse width≤300us,Duty cycle≤20%;
- 4).Essentially independent of operating temperature.

8. Typical Characteristics

Figure 1. On-Region Characteristics

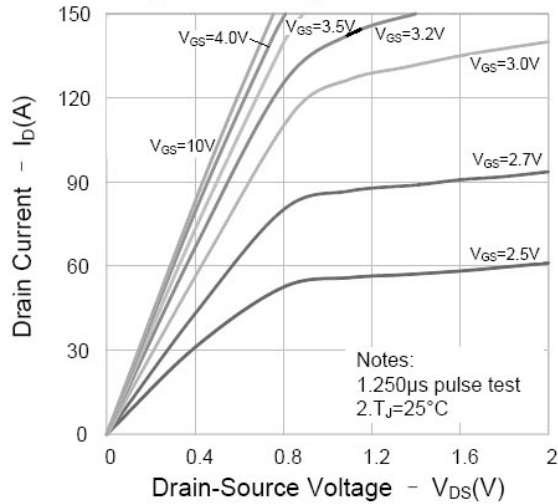


Figure 2. Transfer Characteristics

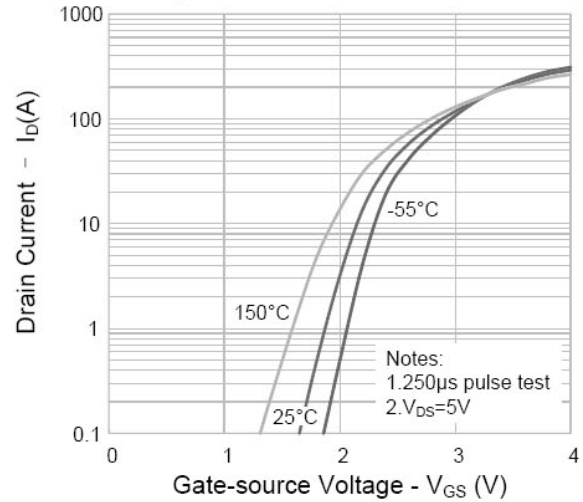


Figure 3. On-resistance vs. Drain Current

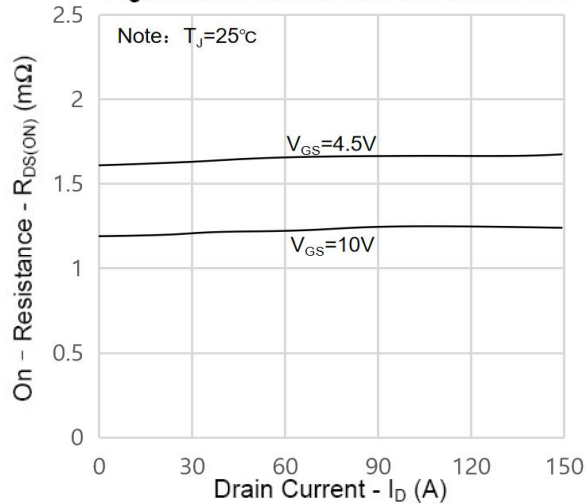


Figure 4. On-resistance vs. Gate-source Voltage

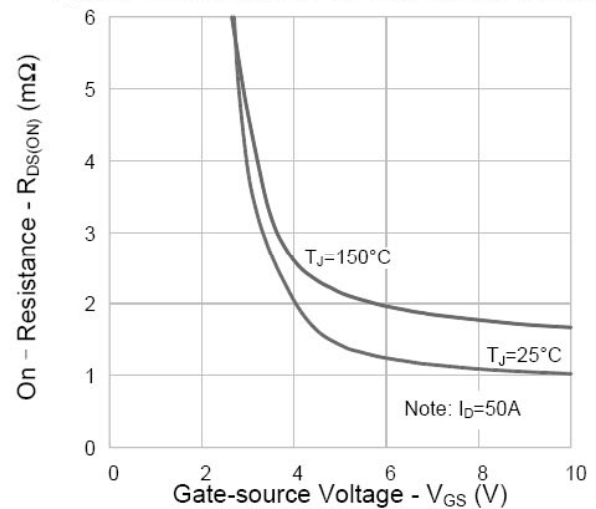


Figure 5. Turn-on Voltage vs. Temperature characteristics

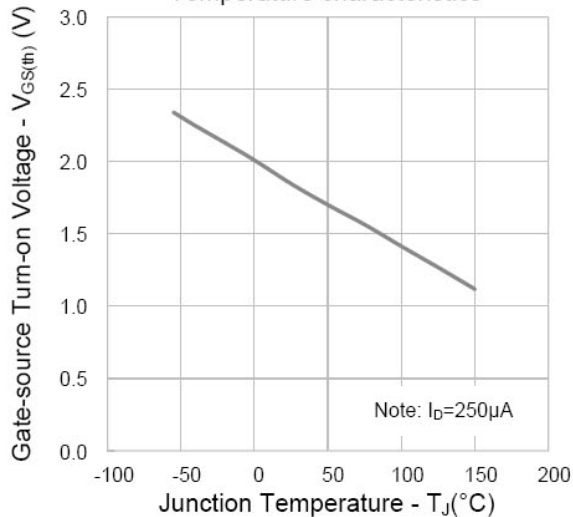


Figure 6. Body Diode Forward Voltage Variation vs. Source Current and Temperature

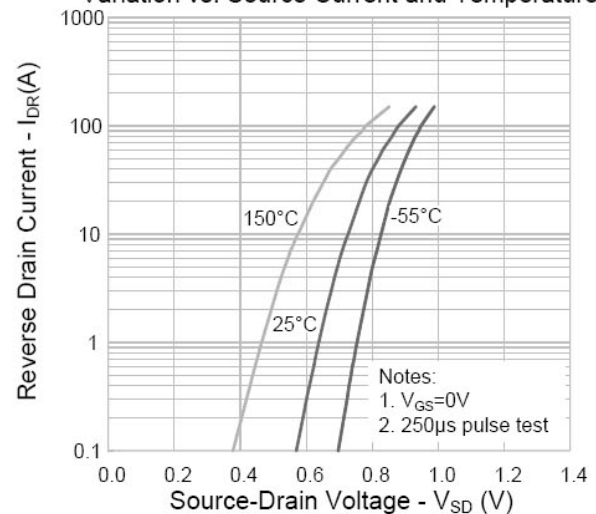


Figure 7. Capacitance Characteristics

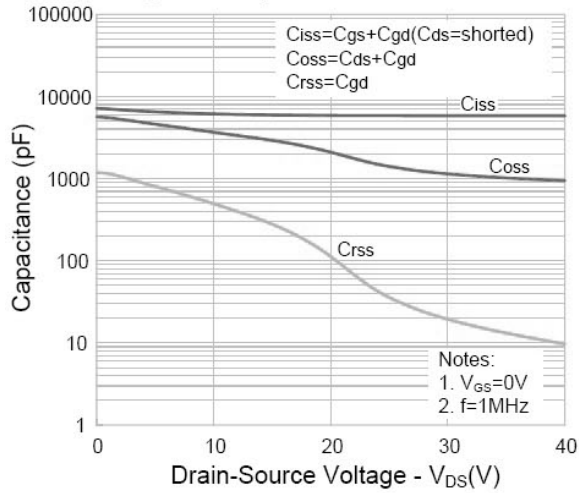


Figure 8. Gate Charge

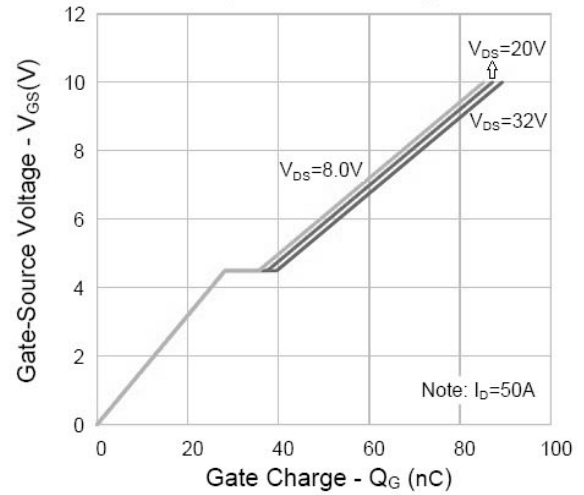


Figure 9. Breakdown Voltage Variation vs. Temperature

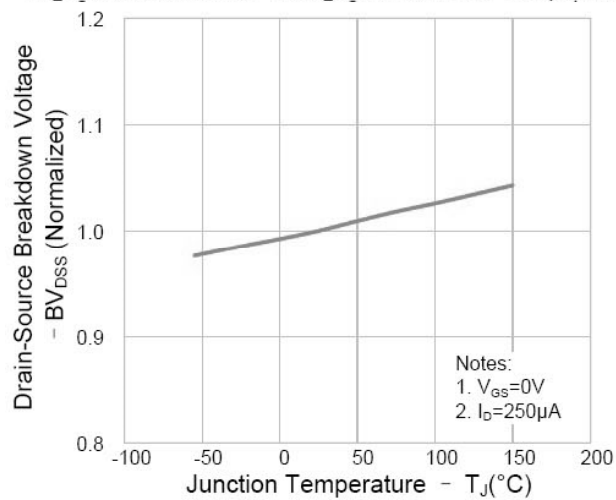


Figure 10. On-resistance Variation vs. Temperature

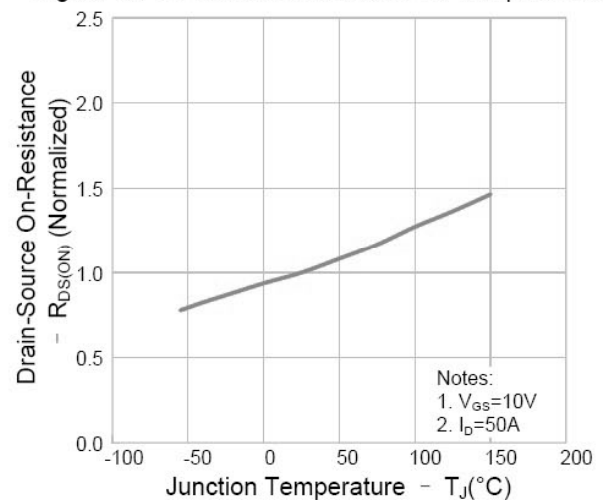


Figure 11. Max. Safe Operating Area

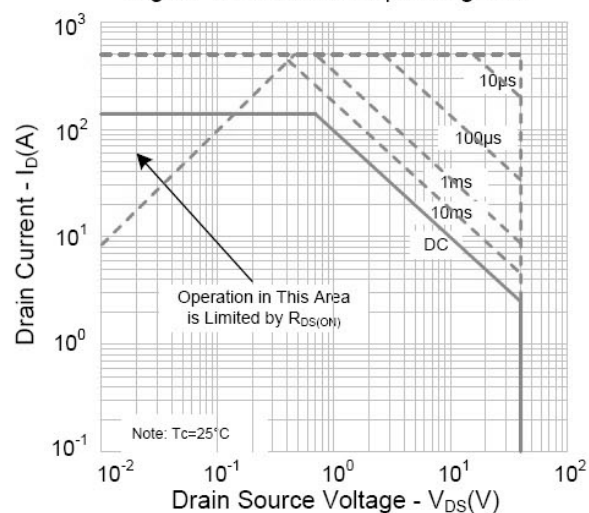
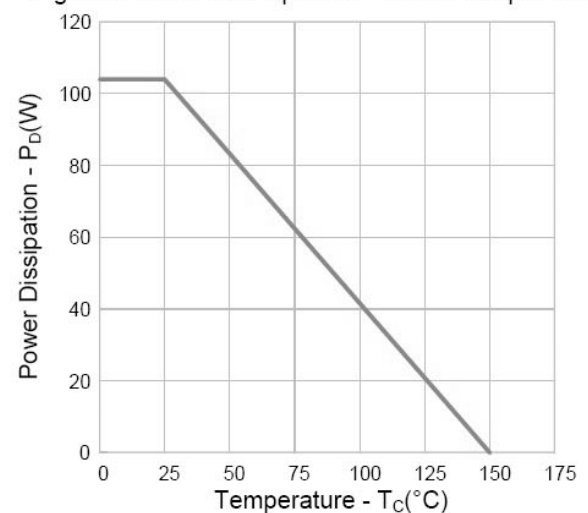
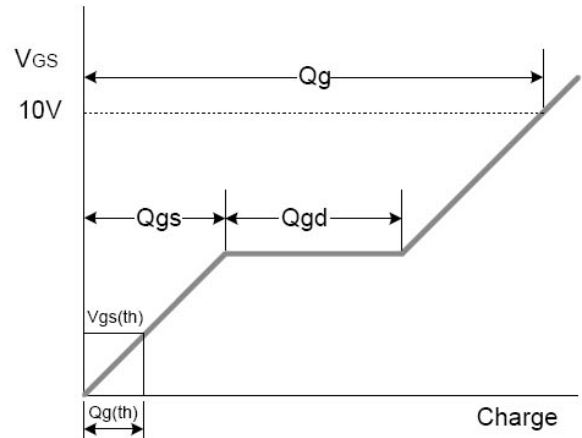
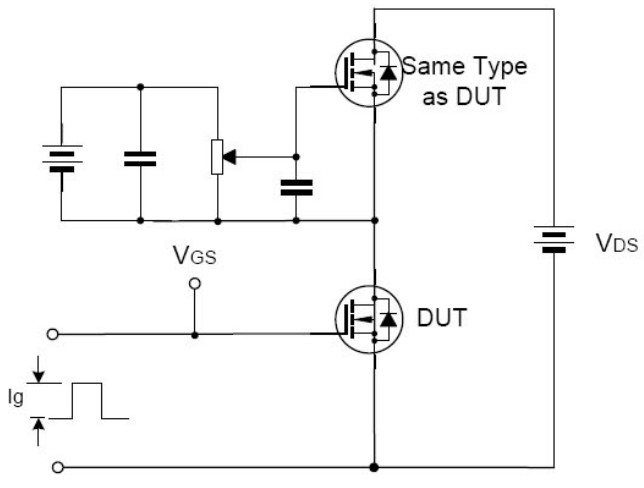


Figure 12. Power Dissipation vs. Case Temperature

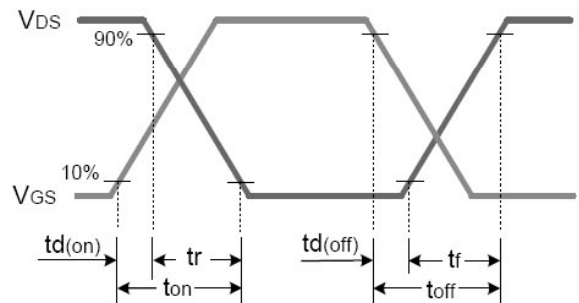
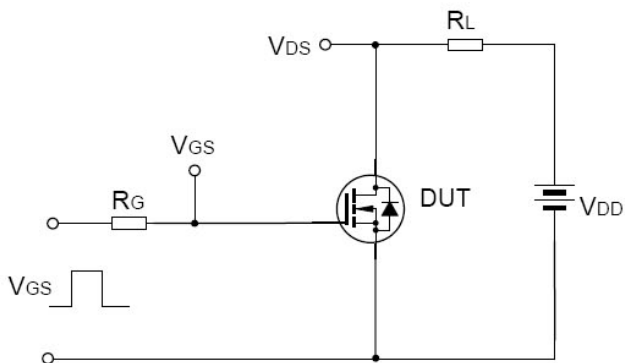


9. Typical Test Circuits

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform

